S&ME



December 20, 2010

Ms. Deb Aja, Western District Supervisor
North Carolina Department of Environment and Natural Resources
Division of Waste Management
2090 U.S. Highway 70
Swannanoa, NC 28778

Reference: **WASTE MANAGEMENT PLAN**
Belews Creek Steam Station
Craig Road Ash Landfill Phase I - Permit #85-04
Stokes County, North Carolina
S&ME Project No. 1411-09-097

Dear Ms. Aja:

On behalf of Duke Energy (Duke), S&ME, Inc. submits this Waste Management Plan for the Belews Creek Steam Station Craig Road Ash Landfill, Phase I, Permit #85-04, as required by GS 130A-309.09D.

If there are any questions regarding this report, please contact me at 828-687-9080, Ext. 315.

Sincerely,
**S&ME, Inc.**

William M. Miller

William M. Miller, PE
Senior Project Engineer

S:\2009 PROJECTS\1411\ENVIRONMENTAL PROJECTS\11 09 097 Duke Energy Env Engineering\Triennial Waste Reduction Plans to DENR-Oct 2010\2010 Plans\BCS Craig Rd\BCS Craig Rd Waste Management Plan - Final.doc

cc: Duke Energy Belews Creek Steam Station
3195 Pine Hall Rd
Belews Creek, NC 27042
Attn: Melanie Martin

Duke Energy Belews Creek Steam Station
3195 Pine Hall Rd
Belews Creek, NC 27042
Attn: Kimberlee Benson, P.E.

Duke Energy
PO Box 1006
Charlotte, NC 28201-1006
Attn: Ed Sullivan, P.E. Mail Code EC13K

| | |
|---|---|
| **Facility Name** | Belews Creek Steam Station Craig Rod Ash Landfill Phase 1 |
| **Permit #** | 85-04 |
| **Location** | Stokes County |
| **Permit Issuance Date** | November 5, 2007. The permit is subject to review every five years. |

## Waste Management Plan Period

The Belews Creek Craig Road Ash Landfill Phase 1 receives waste generated at the Belews Creek Steam Station (Belews Creek). The landfill has a net capacity[1] of approximately 1,940,000 tons, as described in the Construction Plan Application.[2] This capacity corresponds to a volume of approximately 1,921,420 cubic yards of waste placed at a unit weight of 75lb/ft$^3$. This capacity is based on design waste receipts of 1,276 tons per day for 304 operating days per year for a 5 year period. The Waste Management Plan presented is for a five year period.

## Description of Waste Disposed in Landfill

The landfill is permitted to receive the following types of material, produced at the Belews Creek Steam Station:

- Coal ash
- Wastewater treatment sludge by-products
- "Off-spec" gypsum

## Expected Annual Waste Quantities For Five Year Phase

As described in the Construction Plan Application, the landfill was designed to receive 1,921,420 cubic yards tons of waste based on approximate design waste receipts of 1,276 tons per day for 304 operating days per year. The table below presents the quantities of waste that have been placed or that are expected to be placed in the landfill. The yearly periods listed below correspond to the period July 1 through June 30 for the respective year. No waste was placed in the landfill until December 2008.

**Table 1 Quantities of Waste Placed in Landfill**

| Year | Period | Annual Quantity (Actual or Expected) | |
|---|---|---|---|
| Year 1 | 2007-2008 | 0 tons | (Actual) |
| Year 2 | 2008-2009 | 165,476.07 tons | (Actual) |
| Year 3 | 2009-2010 | 277,513.62 tons | (Actual) |
| Year 4 | 2010-2011 | 387,904 tons | (Expected) |
| Year 5 | 2011-2012 | 387,904 tons | (Expected) |

[1] Net landfill capacity is the volume of space below final cover system and above the operational cover system.

[2] Construction Plan Application Craig Road Ash Landfill, Volume I, Duke Energy Corp. Belews Creek Steam Station, Stokes County, NC, S&ME Project No. 1356-03-544, October 26, 2005.

The values for the actual Annual Quantity of waste placed in the landfill, presented in Table 1, were obtained from the NCDENR Industrial Waste Landfill Facility Annual Reports for the respective years.

**Years of Disposal Capacity Remaining**

The landfill was designed to receive approximately 1,276 tons of waste per day for 304 operating days per year. As stated in the Construction Plan Application, the net landfill capacity is 1,940,000 tons.

As of June 30, 2010 the landfill had received approximately 442,989.69 tons of material. The remaining capacity of the landfill is calculated below:

| | |
|---|---|
| 1,940,000 tons | Phase 1 Net Landfill Capacity |
| - 442,989.69 tons | Waste Placed through June 30, 2010 |
| **1,497,010.31 tons** | **Phase 1 Remaining Capacity** |

Based on the approximate tons of waste placed through June 30, 2010 and the design disposal rate, the estimated years of disposal capacity remaining are calculated:

**1,497,010.31 tons Remaining Capacity** / **387,904 tons/year Expected Annual Quantity** = **3.9 Years of Disposal Capacity Remaining**

**Options for Management and Reduction of Wastes**

Belews Creek generates 2240 MW of electric power by combustion of coal. As the largest coal facility owned by Duke Energy in the Carolinas, Belews Creek generates electricity, consuming coal and producing fly ash, typically on a continual basis.

Fly ash generated at Belews Creek is the largest component of the waste stream placed into the Craig Road landfill. The quantity of ash generated at Belews Creek depends on factors such as the use of ash in by-products, the BTU content of the coal, the ash content of the coal burned, and the quantity of coal burned. These factors typically will vary over the course of a single year, causing the quantity of ash produced to vary.

The Belews Creek Steam Station provides electricity to the Duke Energy Carolinas electric system, along with other electrical generating stations. Since Belews Creek is part of a system, the operation of the station and the quantity of ash produced depends on the operation of the system as a whole.

Duke continues to diversify the mix of fuels used to generate electricity in its system by making significant investments in renewable energy projects. In addition to solar, wind, and other renewable energy sources, Duke is testing the use of biomass mixed with coal at some of its traditional all-coal fired power plants.

**Waste Management Strategy – Plans for Waste Reduction and Disposal**

Duke's By-Products Management Group was developed to seek markets and applications for use of coal combustion by products. This group continuously works toward maximizing the use of coal combustion by products. Ash produced at Belews Creek was used in cement and other by-products under the 15A NCAC 13B .1708 rules in the amounts shown below.[3]

| | |
|---|---|
| July 1, 2008 to June 30, 2009 | 416,277 tons used |
| July 1, 2009 to June 30, 2010 | 257,877 tons used |

The regional economic downturn led to a decreased use of ash in by-products during the 2009-2010 period.

The Duke By-Product Management Group is continuing to pursue the use of the ash produced at Belews Creek as a by-product. Duke believes that an improving regional economy will increase the demand for ash used in by-products, resulting in a decrease in the quantity of material disposed in the landfill.

Duke's plans for disposal for the 5 year period (2007 – 2012) are to continue to place material in Phase I for this period. Duke is currently in the process of permitting an additional phase for this landfill.

[3] Quantities shown include bottom ash quantities used for by-products.